

Claims

1. A recording medium having recorded thereon a video stream and
a graphics stream, wherein

5 the video stream constitutes a moving picture, and
 the graphics stream

 constitutes a plurality of menu presentations to be
 composited with the moving picture, and

10 includes a plurality of Display Sets that constitute
 respective menu presentations, each menu presentation being
 composed of one or more pages, and each Display Set including
 version information that shows whether or not content of each
 of the pages in the Display Set has changed with respect to
 a previous Display Set.

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2. The recording medium of Claim 1, wherein

 the graphics stream and the video stream are multiplexed
 together on the recording medium,

20 each Display Set includes a timestamp showing an arbitrary
 point in time on a playback time axis of the video stream, and
 menu presentation according to any one of the Display Sets
 commences at the point in time shown by the timestamp included in
 the Display Set.

25 3. The recording medium of Claim 2, wherein

 each Display Set further includes user interface information
 for instructing a playback apparatus to automatically composite the
 menu presentation with the moving picture when the point in time

shown by the timestamp is passed.

4. The recording medium of Claim 2, wherein
each Display Set further includes user interface information
for instructing a playback apparatus to, when the point in time shown
by the timestamp is passed, composite the menu presentation with
the moving picture if a call operation for a pop-up menu is received
from a user.
- 10 5. The recording medium of Claim 1, wherein
the plurality of Display Sets belong to a single Epoch, the
Epoch being a unit of management, on a playback time axis, during
which presence of management data in a memory that stores graphics
data in a playback apparatus is continuous, and
15 a Display Set that is first in the Epoch includes graphics
data that constitutes the menu presentation, and Display Sets that
are subsequent to the first Display Set lack graphics data that effects
an overwrite of the graphics data of the first Display Set in the
memory.
- 20 6. The recording medium of any of Claims 1 to 5, wherein
the graphics stream is composed of a plurality of pieces of
segment information, and
each piece of segment information is one of (i) a graphics
25 object segment having a plurality of pieces of graphics data, and
(ii) a composition segment defining a menu screen composition and
a display time.

7. A playback apparatus comprising:

a video decoder operable decode a video stream, to obtain a moving picture; and

a graphics decoder operable to decode a graphics stream, to

5 obtain a menu presentation that is to be composited with the moving picture,

wherein the graphics stream includes a plurality of Display Sets that constitute the menu presentation, and

the graphics decoder includes:

10 a composition buffer operable to store a composition segment, the composition segment including page information that corresponds to pages in the menu presentation; and

a write control unit operable to

when a new Display Set is read in accordance with progression of playback of the video stream, compare a page version number in each piece of page information in the read Display Set with a page version number in a corresponding piece of page information stored in the composition buffer, to detect whether contents of the piece of page information have been updated, and

when contents of a piece of page information have been updated, use the updated piece of page information to overwrite the corresponding piece of page information in the composition buffer.

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8. The playback apparatus of Claim 7, further comprising:

a display control unit,

wherein, if a piece of page information is overwritten, a page,

among the plurality of pages in the menu display, corresponding to the rewritten piece of page information is re-presented.

9. The playback apparatus of Claim 8, further comprising:

5 a graphics plane operable to store uncompressed graphics that compose the menu presentation,

wherein the graphics decoder further includes:

a processor operable to decode graphics included in any one of the Display Sets; and

10 an object buffer operable to store uncompressed graphics obtained by the processor, and

re-presenting of a page is performed by reading, from among the uncompressed graphics in the object buffer, uncompressed graphics referred to by the piece of page information stored as a result of 15 the overwriting, and writing the read uncompressed graphics to the graphics plane.

10. The playback apparatus of Claim 9, wherein

the graphics stream is recorded on the recording medium 20 multiplexed with a video stream,

the page information is stored in a packet, the packet including a presentation time stamp that shows an arbitrary point in time on a playback time axis of the video stream, and

the writing to the graphics plane by the display control unit 25 is complete before a current playback position with respect to the video stream reaches the point in time shown by the presentation time stamp.

11. The playback apparatus of Claim 10, wherein
the display control unit has the re-presented menu composited
with the moving picture at a point at which (i) the current playback
position reaches the point in time and (ii) an operation to call
5 a popup menu is has been performed by a user.

12. The playback apparatus of Claim 10, wherein
the display control unit has the re-presented menu composited
with the moving picture at a point at which the current playback
10 position reaches the point in time.

13. The playback apparatus of Claim 10, wherein
the packet that stores the page information includes a decode
time stamp in addition to the presentation time stamp,
15 the writing from the object buffer to the graphics plane is
performed in a duration starting at a point in time shown by the
decode time stamp and ending at the point in time shown by the
presentation time stamp,
the uncompressed graphics written to the graphics plane
20 constitute graphical button materials on a page, and
the display control unit prohibits any change in a state of
the button materials for the duration.

14. The playback apparatus of Claim 7, wherein
25 the graphics decoder includes a processor operable to decode
graphics data included in the Display Set, and have stored, in the
object buffer, uncompressed graphics data obtained as a result of
the decoding, and

the processor writes uncompressed graphics to the object buffer when a first Display Set is read, and when each successive Display Set is read, suppresses overwriting of the uncompressed graphics in the object buffer.

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15. A method of recording to a recording medium, comprising:
a step of generating application data; and
a step of recording the generated application data to the recording medium,

10 wherein the application data includes a video stream and a graphics stream,

the video stream constitutes a moving picture, and
the graphics stream

15 constitutes a plurality of menu presentations to be composited with the moving picture, and

includes a plurality of Display Sets that constitute respective menu presentations, each menu presentation being composed of one or more pages, and each Display Set including version information that shows whether or not content of each 20 of the pages in the Display Set has changed with respect to a previous Display Set.

16. A program for causing a computer to execute playback processing, the program comprising:

25 program code operable to cause the computer to perform processing to decode a video stream to obtain a moving picture; and

program code operable to cause the computer to perform processing to decode the graphics stream to obtain menu presentations

to be composited with the moving picture,

wherein graphics stream includes a plurality of Display Sets
that constitute the menu presentations, and

in the decoding of the graphics stream, the computer is caused

5 to perform processing to, when a new Display Set is read in accordance
with progression of playback of the moving picture, compare a page
version number in each piece of page information in the read Display
Set with a page version number in a corresponding piece of page
information stored in a buffer in the computer, to detect whether
10 contents of the piece of page information have been updated, and

when contents of a piece of page information have been updated,
use the updated piece of page information to overwrite the
corresponding piece of page information in the composition buffer.

15 17. A playback method comprising the steps of:

decoding a video stream to obtain a moving picture; and
decoding a graphics stream to obtain a menu presentation, and
compositing the menu presentation with the moving picture,

wherein the decoding of the graphics stream includes a procedure

20 to cause a computer to perform processing to, when a new Display
Set is read in accordance with progression of playback of the moving
picture, compare a page version number in each piece of page information
in the read Display Set with a page version number in a corresponding
piece of page information stored in a buffer in the computer, to
25 detect whether contents of the piece of page information have been
updated, and

when contents of a piece of page information have been updated,
use the updated piece of page information to overwrite the

corresponding piece of page information in the composition buffer.